



[4910-13]

## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

#### **14 CFR Part 25**

**[Docket No. FAA-2018-0477; Special Conditions No. 25-738-SC]**

### **Special Conditions: Textron Aviation Inc. Model 700 Airplane; Operation without Normal Electrical Power**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final special conditions; request for comments.

**SUMMARY:** These special conditions are issued for the Textron Aviation Inc. (Textron) Model 700 airplane. This airplane will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport-category airplanes. These design features are electrical and electronic systems that perform critical functions, the loss of which could be catastrophic to the airplane. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for these design features. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

**DATES:** This action is effective on Textron on [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]. We must receive your comments by [INSERT DATE 45 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** Send comments identified by docket number FAA-2018-0477 using any of the following methods:

- *Federal eRegulations Portal:* Go to <http://www.regulations.gov/> and follow the online instructions for sending your comments electronically.
- *Mail:* Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE., Room W12-140, West Building Ground Floor, Washington, DC, 20590-0001.
- *Hand Delivery or Courier:* Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.
- *Fax:* Fax comments to Docket Operations at 202-493-2251.

*Privacy:* The FAA will post all comments it receives, without change, to <http://www.regulations.gov/>, including any personal information the commenter provides. Using the search function of the docket web site, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the *Federal Register* published on April 11, 2000 (65 FR 19477-19478).

*Docket:* Background documents or comments received may be read at <http://www.regulations.gov/> at any time. Follow the online instructions for accessing the docket or go to the Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

**FOR FURTHER INFORMATION CONTACT:** Stephen Slotte, FAA, Airplane and Flight Crew Interface Section, AIR-671, Transport Standards Branch, Policy and Innovation Division,

Aircraft Certification Service, 2200 S. 216th St., Des Moines, Washington, 98198; telephone and fax 206-231-3163; e-mail [steve.slotte@faa.gov](mailto:steve.slotte@faa.gov).

#### **SUPPLEMENTARY INFORMATION:**

The substance of these special conditions previously has been published in the *Federal Register* for public comment. These special conditions have been derived without substantive change from those previously issued. It is unlikely that prior public comment would result in a significant change from the substance contained herein. Therefore, the FAA has determined that prior public notice and comment are unnecessary, and finds that, for the same reason, good cause exists for adopting these special conditions upon publication in the *Federal Register*.

#### **Comments Invited**

The FAA is requesting comments to allow interested persons to submit views that may not have been submitted in response to prior opportunities for comment described above. We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data.

We will consider all comments we receive by the closing date for comments. We may change these special conditions based on the comments we receive.

#### **Background**

On November 20, 2014, Textron applied for a type certificate for their new Model 700 airplane. The Model 700 airplane is a turbofan-powered executive-jet airplane with seating for 2 crewmembers and 12 passengers. This airplane will have a maximum takeoff weight of 39,500 pounds.

## **Type Certification Basis**

Under the provisions of Title 14, Code of Federal Regulations (14 CFR) 21.17, Textron must show that the Model 700 airplane meets the applicable provisions of part 25, as amended by Amendments 25-1 through 25-139, 25-141, and 25-143.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Textron Model 700 airplane because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Textron Model 700 airplane must comply with the fuel-vent and exhaust-emission requirements of 14 CFR part 34, and the noise-certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type certification basis under § 21.17(a)(2).

## **Novel or Unusual Design Features**

The Textron Model 700 airplane will incorporate the following novel or unusual design feature: A fly-by-wire rudder-control system that requires a continuous source of electrical power to maintain an operable rudder flight-control system. The loss of this system may result in loss of flight control and may be catastrophic to the airplane.

## Discussion

The Textron Model 700 airplane has a fly-by-wire rudder-control system that requires a continuous source of electrical power to maintain an operable flight-control system. Section 25.1351(d), operation without normal electrical power, requires safe operation in visual flight rule (VFR) conditions for at least 5 minutes after loss of normal electrical power, excluding the battery. This rule is structured around traditional designs that use mechanical control cables and linkages for flight control. These manual controls allow the crew to maintain aerodynamic control of the airplane for an indefinite time after loss of all electrical power. Under these conditions, a mechanical flight-control system provides the crew with the ability to fly the airplane while attempting to identify the cause of the electrical failure, restart engine(s) if necessary, and attempt to re-establish some of the electrical-power-generation capability.

A critical assumption in § 25.1351(d) is that the airplane is in VFR conditions at the time of an electrical failure. This is not a valid assumption in today's airline operating environment, where airplanes fly much of the time in instrument-meteorological conditions on air-traffic-control-defined flight paths. Another assumption in the existing rule is that the loss of all normal electrical power is the result of the loss of all engines. The 5-minute period in the rule is to allow at least one engine to be restarted, following an all-engines power loss, to continue the flight to a safe landing. However, service experience on airplanes with similar electrical-power-system architecture as the Textron Model 700 airplane has shown that at least the temporary loss of all electrical power for causes other than all-engine failure is not extremely improbable.

To maintain the same level of safety envisioned by the existing rule with traditional mechanical flight controls, the Textron Model 700 airplane design must not be time-limited in its operation under all reasonably foreseeable conditions, including loss of all normal sources of

engine or auxiliary power unit (APU)-generated electrical power. Textron must demonstrate that the airplane can maintain safe flight and landing (including rollout and brake control through full stop) with the use of its emergency/alternate electrical-power systems. These electrical-power systems, or the minimum restorable electrical-power sources, must be able to power loads that are essential for continued safe flight and landing, including those required for the maximum length of approved flight diversion.

These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by existing airworthiness standards.

### **Applicability**

As discussed above, these special conditions are applicable to the Textron Model 700 airplane. Should Textron apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the special conditions would apply to that model as well.

### **Conclusion**

This action affects only certain novel or unusual design features on one model of airplane. It is not a rule of general applicability.

### **List of Subjects in 14 CFR Part 25**

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

### **Authority Citation**

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

## **The Special Conditions**

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for Textron Model 700 airplanes.

In lieu of 14 CFR 25.1351(d), the following special condition applies:

Textron must show, by test or combination of test and analysis that the airplane is capable of continued safe flight and landing with all normal sources of engine- and APU-generated electrical power inoperative (electrical power sources excluding the battery and any other standby electrical sources). The airplane operation should be considered at the critical phase of flight, and should include the ability to restart the engines and maintain flight for the maximum diversion-time capability being certified.

Issued in Des Moines, Washington, on November 30, 2018.

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